LinkPi ENC5-V2
Recovery Guide

Re-flashing the U-Boot bootloader via serial (Plain English)

What you're doing, in one paragraph

Your encoder won't boot because its bootloader is broken. You're going to connect three tiny wires from your computer to three pins on the encoder's circuit board. Then a Chinese tool on Windows will push a fresh bootloader file through those wires into the encoder's memory. Once the bootloader is good, the encoder can boot normally again.

What you need

Hardware

- The broken LinkPi ENC5-V2 encoder — do **NOT** plug it in yet.
- A **USB-to-TTL serial adapter**. The common chips are CH340, CP2102, PL2303, or FTDI — any of these will work.
- It must be set to **3.3 V** logic. If it has a jumper labelled 3.3V / 5V, set it to **3.3V**. 5V can destroy the encoder.
- The adapter usually comes with four colored jumper wires: **red, black, white, green** (sometimes yellow instead of white).
- A Windows PC (Windows 10 or 11).
- The encoder's original power supply.

Software (the whole folder will be sent to you)

You'll receive a folder called 528uboot刷机. Inside it:

- 刷机教程.doc — the original Chinese tutorial (the photos it contains are reproduced in this guide).
- `ToolPlatform\ToolPlatform.exe` — the Windows flashing program.
- `enc5v2-528\u-boot.bin` — the new bootloader file for your board.

Put that folder somewhere easy to find, like your **Desktop** or **Documents**.

Read before you touch anything

There is exactly **one way** to permanently destroy the encoder during this procedure, and **one way** to fry your USB adapter. Both are easy to avoid if you follow the four Safety Rules on the next page.

Read the whole guide once before you start. Don't skip the safety section.

⚠ Safety rules — read before you start

Rule 1 — The MIDDLE pin is ALWAYS ground (black wire)

The encoder's board has a row of three pins (or three little metal posts) for the serial connection. The original Chinese tutorial is emphatic about this: 切记中间一定是地线 — *“remember, the middle must be the ground wire.”*

Black wire → middle pin. Always. No exceptions.

If you put a signal wire (white or green) into the middle, or — much worse — the red wire, you will send power into a ground pin and **kill the board permanently**.

Rule 2 — The RED wire is NEVER connected

Your USB-to-TTL adapter has a red wire. It carries power (3.3 V or 5 V). **Do not plug the red wire into anything on the encoder.** The encoder has its own power supply.

Bend the red wire back and tape it to the USB adapter so it can't touch anything. If your adapter has removable jumper wires, you can just unplug the red one entirely.

Rule 3 — Always power the encoder OFF before plugging or unplugging wires

Plug in the three wires first, double-check them, THEN power on the encoder when the guide tells you to. Never move wires while power is applied.

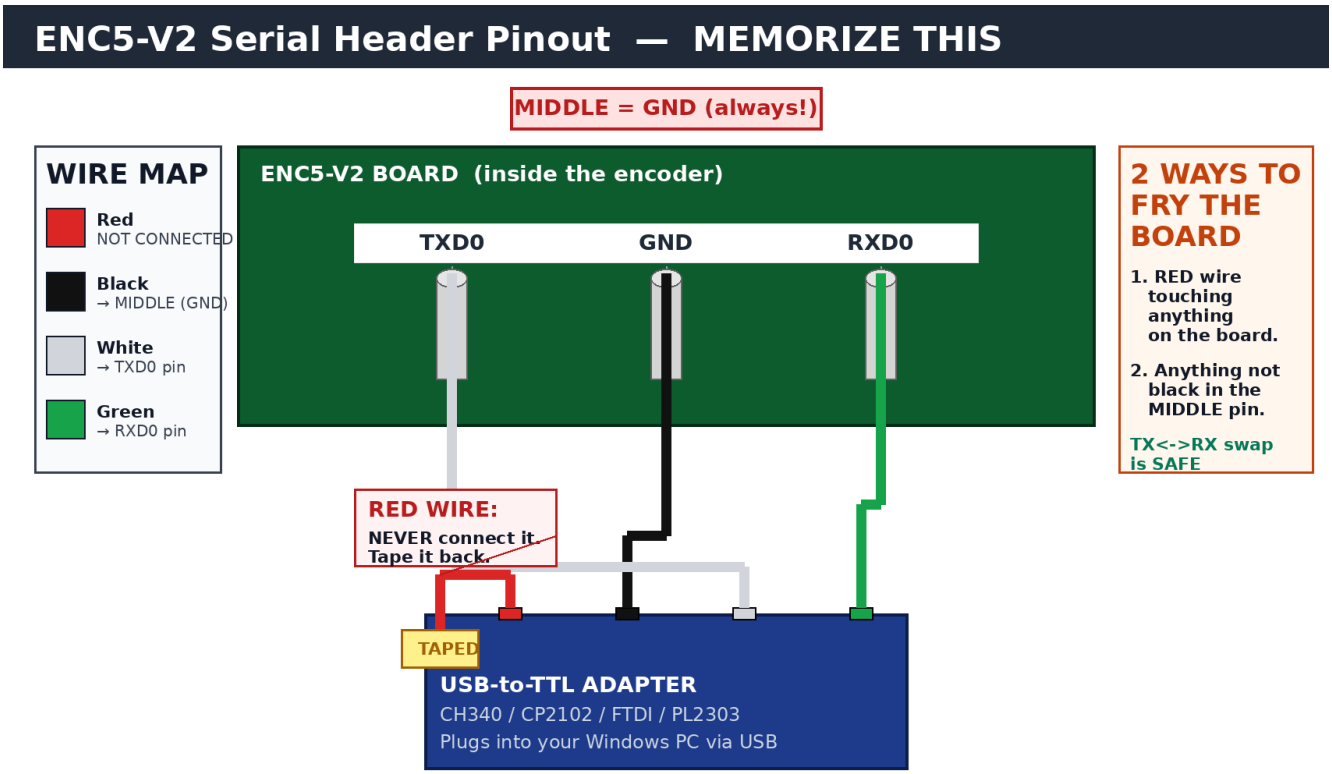
Rule 4 — Getting TX and RX swapped is NOT dangerous

If you mix up the white and green wires, nothing breaks. You just won't see any text in the tool. If that happens, power off the encoder, swap white and green, and try again. This is a normal part of doing this the first time.

> **Quick summary**
>
> **Black** = middle pin (ground). **White** & **Green** = the two outer pins (swap them if it doesn't work). **Red** = stays taped back, never connected.

The pinout — know this cold before you wire anything

This is the most important page in the guide. If you memorise nothing else, memorise this picture.



The three-pin serial header on the ENC5-V2 board (green), wired to a USB-to-TTL adapter (blue). The red wire stays disconnected and taped back.

Don't stress about which outer pin is which

If you're unsure which of the two outer pins is **TXD0** and which is **RXD0**, **just pick an orientation and try it**. Getting white and green the wrong way around does not damage anything — the worst case is that the flash fails silently (no text appears in the log when you power the board on). If that happens, just power off, swap white and green, and try again. Only black-in-the-middle and red-taped-back matter for safety.

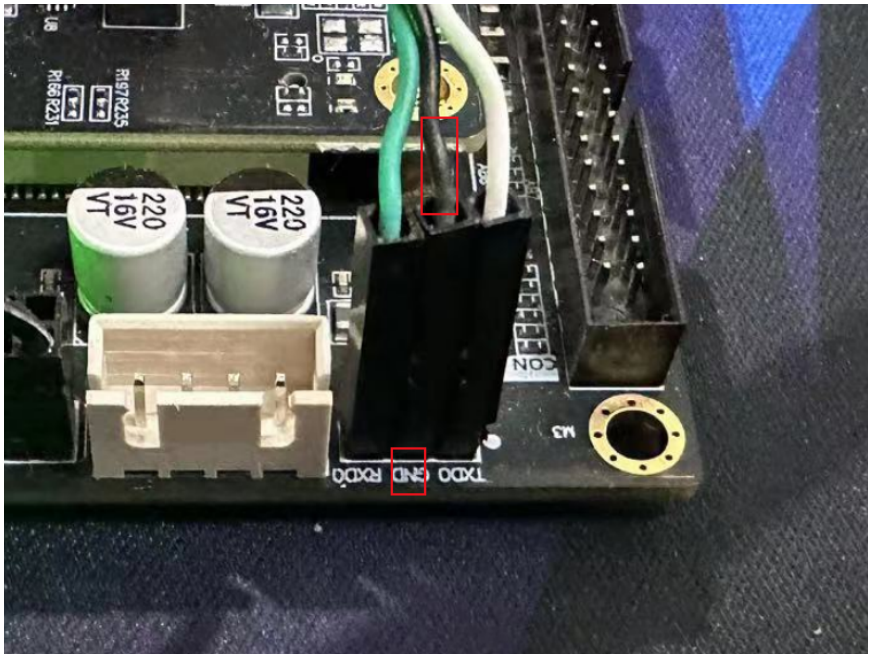
In words:

On the encoder board, near the text `TXD0 GND RXD0` printed on the PCB, you'll find three pins in a row. The tutorial's photo (reproduced on the next page) has a red box around the middle position to hammer home that the middle pin is ground.

Pin on board	Wire color from adapter	What it does	If you get it wrong
TXD0 (one outer)	**White**	Board sends data to PC	Safe — just won't flash. Swap with green.
GND (**middle**)	**Black**	Common ground	**Board dies if anything else goes here.**
RXD0 (other outer)	**Green**	PC sends data to board	Safe — just won't flash. Swap with white.
(none — not used)	**Red**	USB 5V power	**Fries whatever it touches. Tape it back.**

What the pins look like on your actual board

This photo comes straight from the Chinese tutorial. The red box in the picture (drawn by the original author) highlights the middle pin — the GND pin — to emphasise that ground is always in the middle. The tiny white letters on the circuit board, just below the black connector, read: `TXD0 GND RXD0`.



Chinese tutorial, step 5 — TTL serial wiring. TTL串口插线，找到串口接线柱，黑色对应中间的gdn。白色对应tx 绿色rx。（切记中间一定是地线） *Translation: "Plug in the TTL serial wires. Find the serial terminal posts; black goes to the middle (GND). White corresponds to TX, green corresponds to RX. Remember: the middle MUST be ground."*

Before you move on

Check off every one of these before you touch any wires:

☐ Encoder is **unplugged from power**.

☐ USB adapter is set to **3.3 V** (if it has a jumper).

☐ **Red wire** on the adapter is taped back or removed.

☐ You know which of the three board pins is the **middle** one.

☐ **Black wire** is ready to go into that middle pin — nothing else will.

Step 1 — Put the flashing folder on your PC

Copy the 528uboot刷机 folder to your **Desktop** (or anywhere you like). The folder is about 150 MB.

Step 2 — Install the USB adapter driver

Plug the USB adapter into any USB port on your PC **first**. Modern Windows 10 and 11 will often fetch the correct driver automatically via Windows Update — especially for CH340, which is the most common adapter chip. Before you download anything, check whether it already worked:

- Right-click the **Start** button → click **Device Manager**.
- Expand **Ports (COM & LPT)**.
- If you see an entry like `USB-SERIAL CH340 (COM3)` or `Silicon Labs CP210x (COM5)`, you're done with Step 2 — skip to the COM-port section below.
- If instead you see an entry under **Other devices** with a yellow warning triangle, or nothing at all appears, then install the driver manually.

Installing the driver manually (only if needed)

Search online for the driver that matches the chip in your adapter (it's usually printed on the adapter itself):

- **CH340 / CH341:** the cheapest, most common — get it from wch.cn (the maker) or sparkfun.com.
- **CP2102:** search “CP210x VCP driver Silicon Labs”.
- **FTDI:** search “FTDI VCP driver”.
- **PL2303:** search “PL2303 Prolific driver”.

Run the driver installer, then **restart Windows**. Plug the USB adapter into any USB port on your PC.

Find the COM port number

Windows assigns a number like **COM3** or **COM7** to each serial adapter. You need to know which one your adapter got.

- Right-click the **Start** button → click **Device Manager**.
- Find and click the little arrow next to **Ports (COM & LPT)** to expand it.
- You should see something like `USB-SERIAL CH340 (COM3)` — **write down the COM number** (the `COM3` part). You'll need it in Step 6.

If you don't see anything like that, the driver didn't install right. Try installing it again, or try a different USB port.

Step 3 — Open the encoder and find the 3-pin header

Power off the encoder. Unplug it. Open the case (usually 4 screws on the bottom or sides). Inside, on the main circuit board, look for three pins in a row — or three little metal posts — with the text `TXD0 GND RXD0` printed on the board next to them.

Refer to the photo on the previous page. The middle pin is **GND**.

Step 4 — Connect the three wires

With the encoder **still unplugged**, plug the wires into the board exactly like this (see the pinout diagram two pages back):

Wire	Goes to	Reminder
Black	**MIDDLE pin (GND)** on the encoder	**MUST be right.**
White	Outer pin labeled `TXD0`	Safe to swap with green.
Green	Outer pin labeled `RXD0`	Safe to swap with white.
Red	**NOT CONNECTED** — taped back or removed	**Never plug this in.**

STOP and double-check before moving on

☐ Black wire is in the **MIDDLE** pin.
☐ Red wire is **NOT** touching anything on the board.
☐ Encoder is **still unplugged** from power.
☐ USB adapter is plugged into the PC.

Step 5 — Start the flashing tool

- Open the `528uboot刷机` folder.
- Open the `ToolPlatform` subfolder.
- Double-click `ToolPlatform.exe`.
- If Windows SmartScreen warns you that it's an “unrecognized app”, click **More info → Run anyway**. This is a Chinese vendor tool, so Windows doesn't know it.

Force the tool to English (recommended)

The tool auto-picks its language from Windows. If your Windows is already set to English, the tool will come up in English and you're done.

If it opens in Chinese, close it and force English:

- In the `ToolPlatform` folder, right-click `ToolPlatform.ini` → **Open with → Notepad**.
- At the very top of the file, add these two lines (exactly, each on its own line, **above** anything that's already there):

```
-nl
en_US
```

- Save and close Notepad.
- Double-click `ToolPlatform.exe` again — it should now be in English.

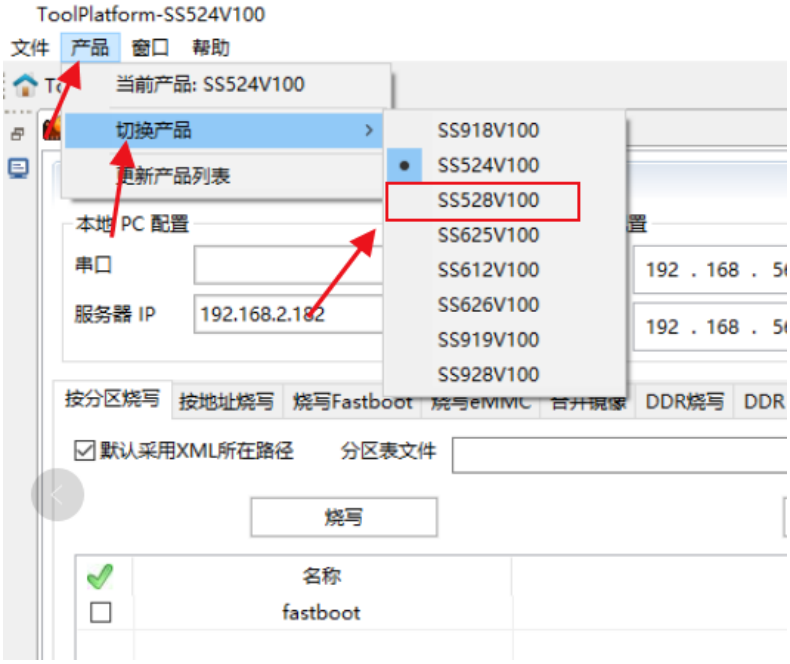
> **If English still won't stick**
>
> Don't worry — use the **Chinese ↔ English translation card** at the end of this guide. Every button and dropdown is translated. Plus, the screenshots on the next few pages are the Chinese screenshots from the original tutorial, with English labels pointing at each important thing.

Step 6 — Configure the tool

Do these in order. If a screen looks different from what's described here, look at the screenshots below — they're the exact screens from the Chinese tutorial with English translations.

6a. Switch processor type to SS528

In the top menu bar, click **Product** (产品) → **Switch Product** (切换产品) → pick **SS528V100**.



Chinese tutorial, step 1 — 切换处理器型号 / "Switch processor type."

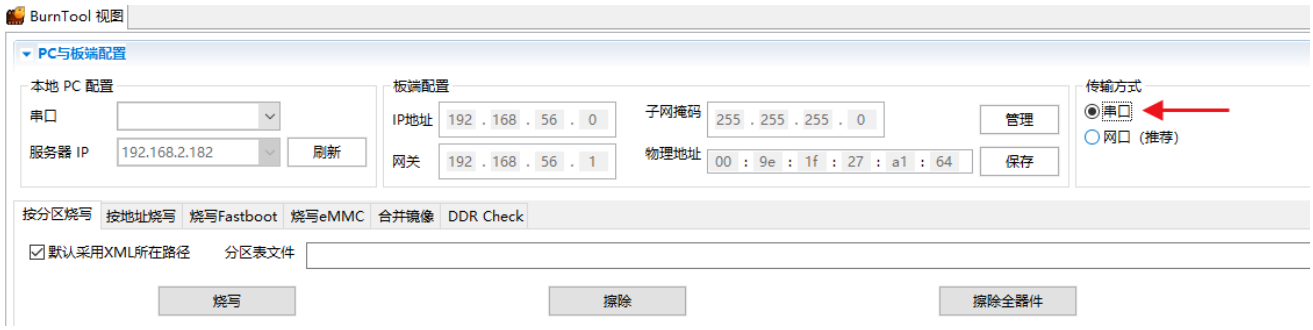
Translation key for this screen:

Chinese on screen	English meaning
文件	File (top menu)
产品	**Product (top menu — click this)**
窗口	Window (top menu)
帮助	Help (top menu)
当前产品: SS524V100	Current product: SS524V100 (wrong chip — change it)
切换产品	**Switch Product → hover over this to see the chip list**
更新产品列表	Update product list
SS528V100 **← pick this**	**This is the chip inside the ENC5-V2.**

6b. Set Transfer Mode to “Serial”

On the main window there's a panel called **PC and Board Config** (PC与板端配置). On the right side of that panel is a box called **Transfer Mode** (传输方式). Click the **Serial** (串口) radio button.

Then on the **left** of the same panel, under **Local PC Config** (本地 PC 配置), find the **Serial Port** (串口) dropdown and pick the COM port you wrote down in Step 2 (for example `COM3`). Leave the baud rate at whatever the tool shows by default — don't change it.



Chinese tutorial, step 2 — 选串口 / “Select serial port.” The red arrow points to 串口 (Serial) under 传输方式 (Transfer Mode).

Chinese on screen	English meaning	What to do
PC与板端配置	PC and Board Config	(section heading)
本地 PC 配置	Local PC Config	(left sub-panel)
串口	**Serial Port (dropdown)**	**Pick your COM port (e.g. COM3)**
服务器 IP	Server IP	Ignore — not used over serial
板端配置	Board Config	Ignore — not used over serial
IP地址	IP Address	Ignore
子网掩码	Subnet Mask	Ignore
网关	Gateway	Ignore
物理地址	MAC Address	Ignore
传输方式	**Transfer Mode**	**(heading of right sub-panel)**
串口 (radio button)	**Serial**	**Select this radio button**
网口 (推荐)	Network (recommended)	Don't pick — we're using serial
管理 / 保存 / 刷新	Manage / Save / Refresh	Buttons — ignore for this task

6c. Click the “Burn eMMC” tab

Across the top of the main panel there are tabs. Click the tab called **Burn eMMC** (in Chinese: 烧写eMMC).

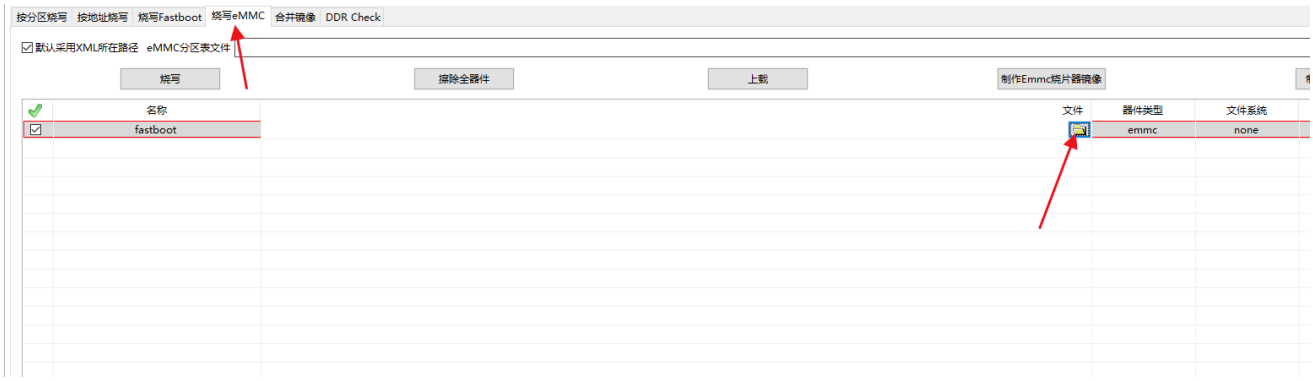
You'll see a table with one row called **fastboot**. That's the row you'll work with — the bootloader gets written into the eMMC's *fastboot* partition.

6d. Pick the bootloader file

In the **fastboot** row, on the right side you'll see a small folder icon in the **File** (文件) column. Click it. A file-picker dialog opens. Navigate to:

```
528uboot刷机\enc5v2-528\u-boot.bin
```

Select it and click Open.



Chinese tutorial, step 3 — 选文件 / “Select file.” Red arrows point to the active 烧写eMMC (Burn eMMC) tab and to the folder icon on the `fastboot` row.

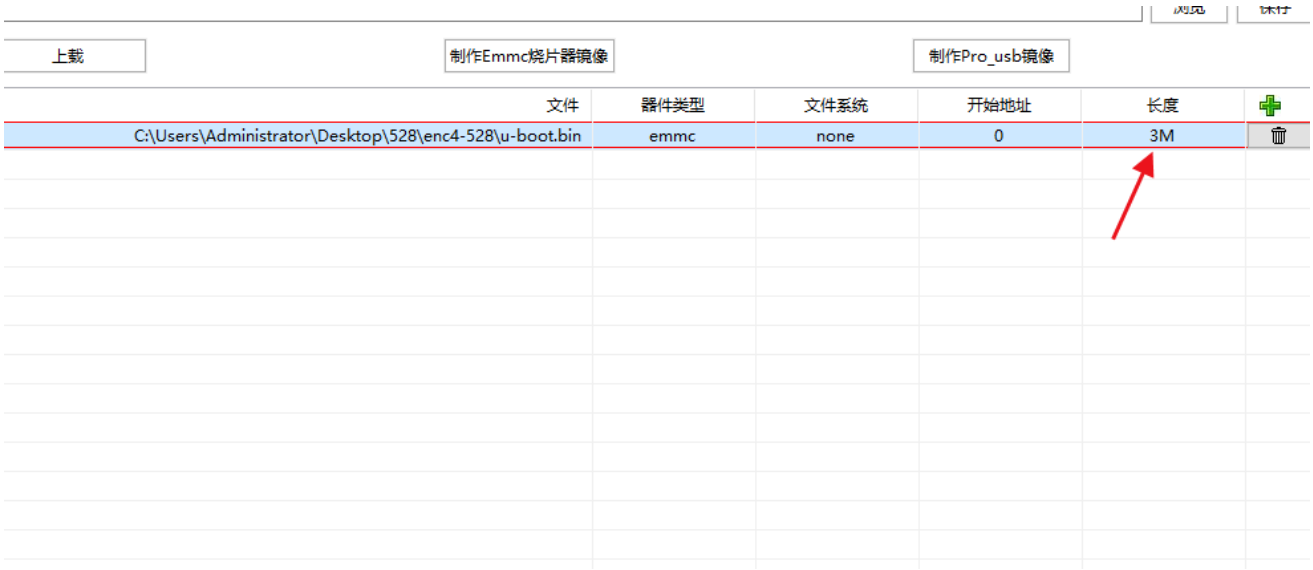
Chinese on screen	English meaning	What to do
按分区烧写	Burn by Partition	Not this tab
按地址烧写	Burn by Address	Not this tab
烧写Fastboot	Burn Fastboot	Not this tab
烧写eMMC	**Burn eMMC**	**Click this tab**
合并镜像	Merge Image	Not this tab
默认采用XML所在路径	Default to XML path	Leave checked (it already is)
eMMC分区表文件	eMMC partition-table file	Leave blank
烧写 / 擦除全器件 / 上载	Burn / Erase entire device / Upload	Don't click yet
制作Emmc烧片器镜像	Build eMMC burner image	Not needed
名称	Name	Shows `fastboot` — the only row here
文件	**File**	**Click the folder icon here → pick u-boot.bin**
器件类型	Device Type	Already says `emmc` — leave it
文件系统	File System	Already says `none` — leave it

6e. Set the Length to 3M

Once the file is picked, the **fastboot** row fills in with several columns. Find the **Length** (长度) column at the far right of the row and type **3M** into it.

- **File** (文件): path to `u-boot.bin` (auto-filled).
- **Device Type** (器件类型): `emmc` — leave default.
- **File System** (文件系统): `none` — leave default.
- **Start Address** (开始地址): `0` — leave default.
- **Length** (长度): `3M` ← the important one. Type this in.

The `3M` means "reserve 3 megabytes of space" — enough room for the bootloader.



Chinese tutorial, step 4 — 手动输入3M / "Manually enter 3M." The red arrow points to the 长度 (Length) column. Note the path in the screenshot says `enc4-528` *because the original tutorial is reused for several encoder models;* ***you should pick*** `enc5v2-528` ***instead*** *since that's the correct folder for your ENC5-V2 board.*

Quick sanity check

Your row should now look like:

```
[✓] <file path>\u-boot.bin emmc none 0 3M
```

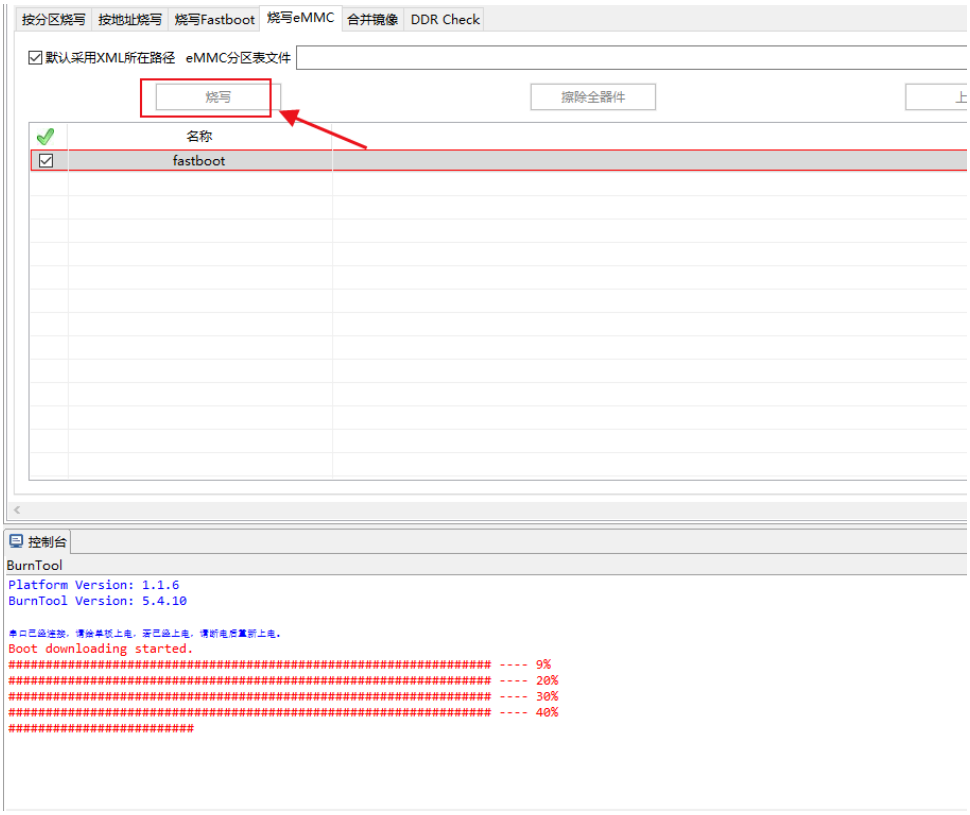
Step 7 — Burn it

Order matters here

Click Burn FIRST, THEN power on the board.

The tool opens a ~15-second handshake window after you click Burn and listens for a board that's just coming out of reset. If the encoder is already powered on when you click Burn, it's already past the moment where the bootloader listens for a serial flash, and the burn will fail with “Failed to send start frame.” The fix if that happens: unplug the board, wait 10 seconds, click Burn, then plug the board back in.

- Double-check that the encoder is still **unplugged from power**.
- In the tool, click the **Burn** (烧写) button at the top of the 烧写eMMC tab.
- The tool will say it's waiting for the device. You'll see Chinese text appear in the log: 串口已连接，请给单板上电 (“Serial port connected — please power the board on”).
- **Now plug in the encoder's power supply.** The tool will detect it and start pushing the bootloader through the serial wires.
- Watch the progress bar / log window. It will take 30–90 seconds. You'll see rows of # marks and percentages counting up.



Chinese tutorial, step 6 — 点一下烧写，再给板子上电 / “Click Burn once, then power on the board.” The red box is around the 烧写 (Burn) button, and the console at the bottom shows the flashing progress.

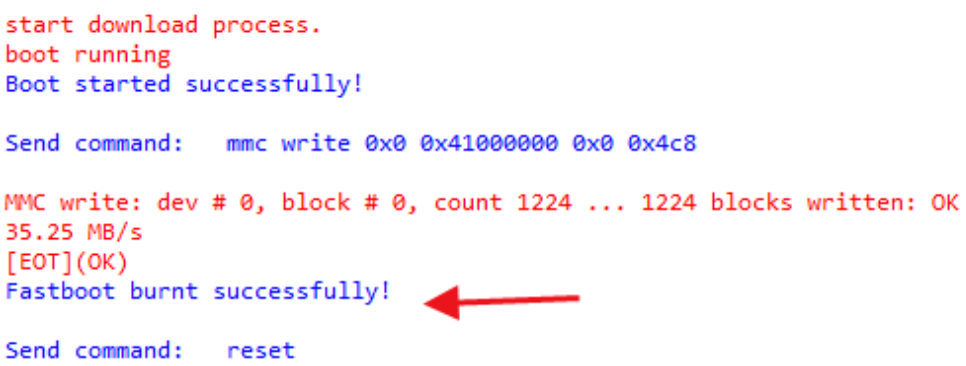
Chinese in the screenshot	English meaning
烧写eMMC (active tab)	**Burn eMMC — the tab we're working on**
烧写 (button, boxed in red)	**Burn — click this to start**
擦除全器件	Erase entire device — don't click
上载	Upload — don't click
名称	Name (column header)
`fastboot`	**the one row you filled in — make sure it's checked**
控制台	Console (the log panel at the bottom)
串口已连接，请给单板上电...	**Serial port connected — please power on the board**
`Boot downloading started.`	(already English in the log — means it worked so far)

Step 8 — Confirm it worked

When the bootloader finishes writing, the console at the bottom of the window will print several lines of English text. The one you want to see is:

```
Fastboot burnt successfully!
```

You'll also see lines like `boot running`, `Boot started successfully!`, and an `MMC write` line — all good signs.


start download process.
boot running
Boot started successfully!
Send command: mmc write 0x0 0x41000000 0x0 0x4c8
MMC write: dev # 0, block # 0, count 1224 ... 1224 blocks written: OK
35.25 MB/s
[EOT](OK)
Fastboot burnt successfully!
Send command: reset

Chinese tutorial, step 7 — 出现该英文，uboot烧写成功 / "When this English text appears, U-Boot flashing succeeded."

That's it — the bootloader is fixed

Unplug the power from the encoder. Disconnect the three wires. Close up the case.

The encoder should now boot normally when you plug it back in.

If it still doesn't fully boot (but the **Fastboot burnt successfully!** message did show up), you probably also need to re-flash the rest of the system image, but that's a separate procedure using the rootfs and kernel files, which aren't covered by this guide.

Troubleshooting

“No text at all, no success message, nothing happens”

Most likely the **white** and **green** wires are swapped. This is safe and expected on a first try.

- Unplug the encoder's power.
- In the tool, click **Stop** or close the burn dialog.
- Swap the **white** and **green** wires (white goes where green was; green goes where white was).
- Leave **black** in the middle — do not touch it.
- Start from Step 7 again.

“Failed to send start frame” or similar

- Make sure the encoder was fully **unplugged** when you clicked Burn, then plug it in **after** clicking Burn. If it was already powered on, stop, unplug it, wait 10 seconds, and try again.
- Make sure you picked **SS528V100** as the processor type — not some other chip.
- Make sure you picked the right COM port.
- Make sure you're on the 烧写eMMC **(Burn eMMC)** tab and the `fastboot` row is checked.

“Cannot open COM port” / 串口连接失败

Another program is using the COM port. Close PuTTY, Arduino IDE, or any other serial program and try again.

“The USB adapter doesn't show up in Windows”

- Try a different USB port on the PC.
- Reinstall the driver for your adapter's chip (CH340 / CP2102 / FTDI / PL2303).
- Restart Windows after installing the driver.
- Check Device Manager again under **Ports (COM & LPT)**.

The board made a pop or smells burnt

> **Stop immediately**
> Unplug everything. The most likely cause is one of the two things we warned you about: the middle pin was not ground, or the red wire touched something. There is no software fix for this — the board is physically damaged and will need a replacement.

Quick reference card

Wires

Wire	Goes to	Notes
Black	Middle pin (GND) on the board	MUST be correct
White	Outer pin labeled TXD0	Safe to swap with green
Green	Outer pin labeled RXD0	Safe to swap with white
Red	NOT CONNECTED — taped back	NEVER plug in

Tool settings

Setting	Value
Product / processor	SS528V100
Transfer Mode	Serial (串口)
Serial Port	Your COM port (e.g. COM3)
Baud Rate	Leave default
Tab to click	**Burn eMMC** (烧写eMMC)
Row to edit	`fastboot`
File	`enc5v2-528\u-boot.bin`
Device Type	`emmc` (default)
File System	`none` (default)
Start Address	`0` (default)
Length	`3M` ← type this

Order of operations

Unplug board → wire up (black first, then white & green; red stays taped) → open the tool → pick SS528 → pick Serial + COM port → go to the **Burn eMMC** tab → pick `u-boot.bin` → type `3M` for length → click **Burn** → **plug in the board** → wait for “Fastboot burnt successfully!” → unplug board → remove wires.

Things that look scary but mean things are fine

- Rows of # characters in the console — that's the progress bar.
- Percentages like `9%, 20%, 30%...` — progress counting up.
- The log switching between English and Chinese — it does that.
- Taking up to 90 seconds — normal.

Chinese ↔ English translation card

If the tool comes up in Chinese, use these tables to match what's on screen to its English meaning.

Tabs across the top of the main panel

Chinese on screen	English meaning	Use it for
烧写Fastboot	Burn Fastboot	(not this recovery)
按地址烧写	Burn by Address	(not this recovery)
按分区烧写	Burn by Partition	(not this)
按分区烧写（spi/nand/emmc）	Burn by Partition (spi/nand/emmc)	(not this)
烧写eMMC	Burn eMMC	← use this one
烧写eMMC或UFS	Burn eMMC or UFS	(not this)
合并镜像	Merge Image	(not this)
校验和	Checksum	(not this)
DDR烧写	DDR Burn	(not this)
DDR Check	DDR Check	(not this)
单板检测	Board Check	(not this)

Columns on the “Burn eMMC” tab row

Chinese on screen	English meaning	Use it for
名称	Name	e.g. fastboot
文件	File	Click folder icon — pick u-boot.bin
器件类型	Device Type	emmc (default)
文件系统	File System	none (default)
开始地址	Start Address	0 (default)
长度	Length	Type 3M

Transfer-mode options (传输方式 dropdown)

Chinese on screen	English meaning
网口（推荐）	Network (recommended)
网口（单板已有boot）	Network (board already has boot)
串口	Serial ← pick this
USB烧写	Burn over USB
串口+USB	Serial and USB
USB口	USB Port
JTAG	JTAG
JTAG+网口	JTAG and Network
JTAG+串口	JTAG and Serial

Buttons

Chinese on screen	English meaning
烧写	Burn
擦除	Erase
浏览	Browse
保存	Save
管理	Manage
刷新	Refresh
启动	Start
上载	Upload
擦除全器件	Erase entire device

Panel / section headings

Chinese on screen	English meaning
本地 PC 配置	Local PC Config
板端配置	Board Config
PC与板端配置	PC and Board Config
提示	Tips / Important notes
控制台	Console (log panel at bottom)
传输方式	Transfer Mode
串口	Serial Port
波特率	Baud Rate
IP地址	IP Address
服务器 IP	Server IP
网关	Gateway
子网掩码	Subnet Mask
物理地址	MAC Address
频率	Frequency

Result messages and log text

What you want to see at the end

Chinese on screen	English meaning
烧写成功!	Burn Success! — good ✓
Fastboot burnt successfully!	(already English) — the actual success line ← look for this ✓
擦除成功!	Erase Success

Error messages you might see

Chinese on screen	English meaning
烧写失败!	Burn Failed — see Troubleshooting
擦除失败!	Erase Failed
请选择串口	Please select a serial port
请选择要烧写的文件	Please select a file to burn
串口连接失败	Failed to open serial port
该设备不被BurnTool支持	Device not supported by BurnTool
文件不存在	File does not exist
串口已连接，请给单板上电，若已上电，请断电后重新上电	Serial port connected. Please power the board on. If it's already on, unplug and re-plug power.

Log output — things you'll see during a successful burn

After you click **Burn** and power on the board, the console at the bottom of the tool will print roughly this sequence. Everything in `this font` is already in English; the lines in red in the screenshots are Chinese progress messages whose meanings are listed in the table above.

```
Platform Version: 1.1.6
BurnTool Version: 5.4.10
串口已连接，请给单板上电… ← power on the board now
Boot downloading started.
#### ---- 9%
####### ---- 20%
... (more progress lines)
start download process.
boot running
Boot started successfully!
Send command: mmc write 0x0 0x41000000 0x0 0x4c8
MMC write: dev # 0, block # 0, count 1224 ... 1224 blocks written: OK
[EOT](OK)
Fastboot burnt successfully! ← YOU'RE DONE ✓
Send command: reset
```

End of guide

If you see **Fastboot burnt successfully!** in the log, the bootloader is written. Unplug the power, take the wires off, close the case, and power the encoder back up.